Use of Drains After Evacuation of Chronic Subdural Hematomas

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A *subdural hematoma* (SDH) is a collection of blood that accumulates between the surface of the brain and its outermost covering, called the dura. These types of hematmas usually result from tears in bridging veins that cross this subdural space, which is typically the result of some form of trauma. A patient's risk of developing a SDH increases with age as the brain tends to pull away from the dura, therefore stretching the bridging veins and increasing the subdural space. In addition the risk of progression of a SDH is greater if the patient is already regularly taking an anticoagulant such as Aspirin, Plavix, or Coumadin.

Subdural Hematomas Can Lead to a Variety of Symptoms[3] Including:	
Headache	Lethargy
confusion or disorientation	Weakness
Numbness	Difficulty with balance or walking
Nausea and/or vomiting	Slurred speech
Loss of consciousness	Seizures

The treatment of symptomatic SDH involves surgical evacuation, which can be achieved via dburr holes or through a craniotomy. After this initial procedure to evacuate the SDH, some surgeons will place a subdural drain to help ensure that all of the blood products are removed and to reduce the risk of recurrence of the SDH; however, not all surgeons will do so and the use of subdural drains is a matter of debate[2]. Major arguments against drain placement include increased risk of damage to the brain with placement of a subdural drain and an increased risk of infection in leaving a drain in place. These concerns, however, are more or less anecdotal since recent evidence-based studies have demonstrated the efficacy of leaving a subdural drain in place.

Table I: Recurrence		
Study	**Result with Drain**	**Result Without Drain**
Ramachandran et al.[3]	4% (6/165)	30% (130/442)
Gazzeri et al.[1]	7.6 % (17/224)	N/A
Santarius et al.[3]	9.3% (10/108)	24% (26/107)
Yu et al[5]	6.6% (8/121)	
Rate was 16.3% for patients with < 3 days of drainage (7/43 cases), 1.3% with 3 or more days (1/78 cases).	N/A	N/A

Table II: MORTALITY		
Study	**Result with Drain**	**Result without Drain**
Santarius et al.[3]	8.6% (9/105)	18.1% (19/106)
Gazzeri et al.[1]	0.9% (2/224)	N/A
Zumofen et al.[5]	3.4% (5/147)	N/A

Recent published studies including a single randomized controlled trial have evaluated the effect of placing a subdural drain with all other factors being held equal. The results of a literature search are presented in Table I, which summarizes recurrence rates, and in Table II, which summarizes overall mortality.

The only available randomized controlled study was performed between November 2004 and November 2007 at Addenbrooke's Hospital in Cambridge, UK by Santarius et al.[4] All patients underwent evacuation with two burr holes and were subsequently randomized to whether a subdural drain was placed. Outcomes were determined with questionnaires obtained at 30 days and at 6 months. A few shortcomings of this study include the inability to mask treatment allocation, missing data from incomplete questionnaires and incomplete recording, and the fact that it was a single-center study. Nevertheless, this study was able to demonstrate that using drains reduced both the recurrence rate of SDH and the 6 months' mortality rate. Furthermore, there was no difference in length of hospital stay or in overall complication rates, including infection rates.

Another study that compared cohorts with and without drains was performed by Ramachandran et al.[3] They found that recurrence rates were lower when drains were used; but mortality rates were not reported within the drain and no-drain cohorts. As a retrospective study, drawing on data collected in the normal course of operations, it lacks the reliability of prospective studies, which are designed specifically to focus on the effect of an intervention.

In the evidence-based hierarchy, case series within a single cohort are considered to be the least reliable. In three such studies reviewed, all patients received drains and their outcomes were evaluated. Yu et al[5] was a single cohort study involving procedures performed from January 1997 to June 2008. All patients had subdural drains placed, and a subgroup analysis indicated that patients whose drains were in for longer periods (at least three days) had lower recurrence rates. In addition, prolonged duration of drainage did not increase rate of infection; however, mortality was not reported

in this study. Gazzeri et al.[1] and Zumofen et al.[5] reported case series in which extracranial drains were used. Although mortality rates were comparable or lower to cohorts with subdural drains, and overall morbidity was decreased, recurrence rates were generally higher

Taking all of these studies into consideration, the following guidelines for drains in SDH is proposed:

- Drains should be placed after evacuation of chronic subdural hematomas.
- Drains should remain for 72 hours postoperatively

Placement of a subgaleal drain may be a safer method, but may not be equally as effective as a subdural drain.

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